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EXAMINER

LEWIS, CHERYL RENE A

ART UNIT

PAPER NUMBER

2177

DATE MAILED: 06/01/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

8

Office Action Summary

Application No.

09/928,894

Applicant(s)

ALPHA ET AL.

Examiner

Cheryl Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office action is in response to the applicants' communication received on March 18, 2004, paper no. 7.
2. Claims 1-21 are presented for examination.
3. Applicant's arguments received on March 18, 2004, paper no. 7, have been fully considered but they are not deemed to be persuasive.

Response to Arguments

4. a. On page 6, lines 1-15 of the applicants' arguments, the applicants have argued the following:

'Claim 1 concerns a method of generating an index to provide access to a database that includes both structured and unstructured data columns.'

- a1. The examiner respectfully disagrees with the applicants' arguments.

Regarding Claim 1, Cheng teaches (1) generating an index to provide access to a database (column 7, lines 1 and 2, '...is sorted on the columns being joined or accessed via an index...', Abstract, lines 1-9, 'A computer database system utilizes a method for performing...sorted or accessed using a sorted index.') and (2) including both structured (column 6 lines 58-67, column 7 lines 1-7) and unstructured data columns (column 2 lines 36-42, column 3 lines 27-30 and 60-65). The Examiner understands that a structured data conditions may include equality conditions such as =, <, or > (Specification page 9, lines 9 and 10) and an unstructured data conditions may include

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Boolean operators such as AND, NOT, or OR (Specification page 9, lines 14 and 15).

The Examiner believes that the claim limitations for structured and unstructured data was clearly presented in the prior Office Action mailed December 19, 2003, paper no. 6. Likewise, the Applicants also supports the Examiner's position regarding the structured and unstructured claim limitations. In the applicants' remarks the applicants' have recited "Applicant agrees that Cheng discloses that a database may include a table that has a structured column and another table that has an unstructured data column."

b. On page 6, lines 13-15, The applicants' arguments recite the following:

'For example, the conditions that the Examiner claims to disclose unstructured conditions (col. 3, lines 52-67, col. 4, lines 1-15 and 30-50 in Cheng) actually disclose structured conditions (e.g., < <= > >= =).'

b1. The examiner agrees with the applicants arguments. As stated in the arguments above, the examiner does understand and recognize the difference between the structured data and unstructured data. The applicants are correct that the unstructured conditions were identified as structured conditions. The Examiner had mistakenly placed the identified content for unstructured data as structured data and structured data as unstructured data. Therefore, in the Office Action presented below the Examiner has placed the identified content for structured and unstructured data in its correct format.

c. On page 6, lines 9-13, The applicants' arguments recite the following:

'Cheng does not disclose building a combined index... Furthermore, Cheng only discloses queries that use structured conditions. Cheng does not disclose queries that combine structured and unstructured conditions.'

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c1. The examiner respectfully disagrees with the applicants' arguments. Cheng teaches queries that combine both structured and unstructured conditions. (1) For the structured conditions Cheng states 'We would like to formulate the following query (Query 1). Give all the current sales information, and last year sales information for products of the same type, if the current year sales are not profitable and the last year's sale amount is equal to or less than the current sale amount.' (column 2, lines 55-59). Further, Cheng teaches unstructured conditions where the <Predicate> of the ON clause of the outer join has the same format as the Where clause (a mixture of AND, Ors, and NOTs of conditional expressions, which include query predicates) of SQL statements (column 3, lines 25-30). Further, Cheng teaches queries combine both structured and unstructured conditions, where the predicates involving θ s are called special predicates. These predicates are used in a special way. Ω may be the Boolean operator (wedge) or \vee . Cheng uses a series of query and subquery statements that combine both structured and unstructured conditions, where all Ω s are \wedge s, θ s are equalities, and allowed to exist if the following two conditions hold. First, C_{11}, \dots, C_{1k} form a unique key of T_1 table. Second, none of the above columns have associated with only an F_{ij} which is a universal quantifier subquery (ALL subquery). Note that in this case, the special equality predicates on the columns not part of the unique key are also considered to be part of P_{12} . Example Query 2 falls into this category since pno is a unique key of the outer relation. Also, Query 1 falls into this category if it eliminates the predicate $ls.sales \leq cs.sales$. Category 2 comprises states predicate is not category 1 and contains conjuncts of special equality or inequality predicates all Ω s are

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As, each θ is one of $=$, $>$, \geq , $<$, \leq , and P_{12} does not exist. Example Query 1 falls into this category (column 3 lines 55-64, column 4 lines 15-49, column 15, lines 47-67).

Although, the applicants' arguments state that Cheng does not disclose building a combined index, the Examiner has not relied on the Cheng reference to teach a combined index. The Examiner has cited Chaudhuri as teaching the combined index.

d. On page 6, lines 16-18, the applicants' arguments recite the following:

'Chaudhuri does not cure the defect in Cheng. While Chaudhuri discloses merging two separate indexes into a database table, it does not teach producing a combined index of the structured and unstructured data columns.'

d1. The examiner respectfully disagrees with the applicants' arguments. The examiner has relied on the Chaudhuri reference to teach a combined index. Chaudhuri teaches an index merge tool, the index merge tool identifies and merges each combination of indexes by identifying and merging one pair of indexes at a time. Also, Chaudhuri teaches handling queries to access the indexes. Chaudhuri states that a database server in accessing a database in accordance with a workload of queries, the index merge tool uses the merged set of indexes as the index configuration for use in executing queries against the database (Abstract, lines 1-13).

The examiner respectfully disagrees with the applicants' arguments, regarding the Cheng and Chaudhuri references for the combined 103 rejection. It is believed that the combination of references does constitute a proper 103 rejection. Court rulings state (1) Common sense, an artisan is likely to extract more than a layman from reading a reference. Furthermore, as the Court has said "it is not necessary that the cited references or prior art specifically suggest making the combination."

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In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (CAFC 1988).

e. On page 7, lines 11-14, the applicants' arguments recite the following:

'...Cheng does not disclose an indexing logic that produces an index to this viewable result...Although Chaudhuri discloses merging two indexes into one index, it does not disclose an indexing logic that produces the combined index structure.'

e1. The examiner respectfully disagrees with the applicants' arguments. In the Office Action, March 18, 2004, paper no. 7, the Examiner has rejected independent claims 10 and 16 along with claim 1 because these claims primarily comprise the same claim limitations. Likewise, the applicants have reproduced arguments presented in the argument of claim 1 along with the arguments of claims 10 and 16.

The Examiner has not relied on the Cheng reference to teach a viewable result. The Examiner has cited the Chaudhuri reference to claim a viewable result. In fact, the applicants claims recite 'a user interface for receiving instruction from a user.' Chaudhuri teaches a user may enter commands and information into personal computer 120 through input devices such as keyboard 140 and pointing device 142. Other input devices may include a microphone, joystick, etc. Chaudhuri also comprises a monitor 147 or other type of display device that is connected to a system bus 123 via an interface, such as a video adapter 148 (column 4 lines 65-67, column 5 lines 1-8). It would have been obvious to one of ordinary skill in the art of computer processing that a user can input or enter commands into a computer via input devices such as a keyboard or other input devices. Likewise, the database system of Chaudhuri consists of viewable results because Chaudhuri's system comprises a display device, and an index merge tool which forms and outputs index configuration for use by the database server

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from an input set of indexes in accordance with a workload and query optimizer (column 6 lines 4-11).

Webster's dictionary defines "logic" as principles of reasoning of the structure of content, events, etc. Therefore, the examiner believes that Chaudhuri does teach indexing logic that produces the combined index structure. Chaudhuri teaches the indexing logic of its' database system is associated with a particular data structure. This data structure referred to as an index merge tool. The index merge tool comprises an index filter, an index merge control tool, and a merge pair tool. The index filter, index merge control tool, and merge pair tool are each implemented as program modules or computer-executable instructions. The index merge tool merges at least two indexes of the set of indexes S to form a merged set of indexes S' such that the merged set of indexes S' consumes less storage space than that consumed by the set of indexes S (column 6, lines 64-67, column 7, lines 1-19). Therefore, Chaudhuri's index merge tool provides logic consisting of reasoning for the structure of an index structure based on the claimed indexing logic.

f. On page 7, lines 15-17, the applicants' arguments recite the following:

'...neither discloses nor suggests providing for data retrieval based on a query that includes conditions...'

f1. The examiner respectfully disagrees with the applicants' arguments.

Microsoft Press' Computer Dictionary defines "query" as the process of extracting data from a database and presenting it for use. Cheng teaches a relational database comprising variations of queries. The queries are implemented using a series of conditional SQL statements or subquery predicates consisting of structured and

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unstructured conditions in an effort to access and manipulate data within a relational database and to return the results of the queries as stated in the above recited arguments.

Also, Chaudhuri teaches processing queries in a database system. The database system comprises a database server to process queries to retrieve, insert, delete, and/or update data in a database. Chaudhuri uses SQL statements for queries include data manipulation for selection, inserting, deleting, and updating data, wherein these data manipulation techniques return results of the data to the database after the specified query has been performed to the data (column 5 lines 54-60).

g. On page 7, lines 26 and 27, the applicants' arguments recite the following:

'But Cheng does not disclose a single table that has both structured and unstructured data.'

g1. The examiner disagrees with the applicants' arguments. The applicants' recited remarks, 'But Cheng does not disclose a single table that has both structured and unstructured data.', are contradictory to the applicants' earlier remarks presented on page 6 regarding the Cheng reference. On page 6, lines 3-5 of the applicants' remarks it appears that the applicants share the same view of the Cheng reference that the Examiner has regarding the column, table, and unstructured and structured data conditions. In fact, the applicants' state "Applicant agrees that Cheng discloses that a database may include a table that has a structured column and another table that has an unstructured data column." Now on page 7, lines 26 and 27 of the applicants' remarks the applicants' are stating that Cheng does not disclose a table having both structured and unstructured data.

h. On page 8, lines 11-18, applicants' arguments recite the following:

'The Examiner asserts that Cheng teaches means for converting unstructured data to a structured form.'

h1. The examiner respectfully disagrees with the applicants' arguments.

Regarding claims 16 and 21 and as cited in the arguments above, Cheng comprises a variety of query predicates and conditions comprising unstructured and structured data wherein the unstructured data can be converted to structured form. Again, Cheng teaches predicates can consist of =, >, >=, <, <= and Ω may be the Boolean operator. Cheng teaches how these predicates comprise both unstructured and structured conditions generated by a query within a table to produce a defined data result (column 3 lines 25-67, and column 4 lines 1-52).

Claims 2, 3, 4, 6, 11, 13, 14, 18, 19, and 20, these claims were rejected based on the Whang reference. The Examiner has relied on Whang to teach (1) an inverted index (Abstract, lines 1-10); (2) an inverted index table is generated based on tokens (column 3 lines 22-37, column 6 lines 32 and 61); and (3) adding to the inverted index (column 3 lines 22-38). The Examiner has not relied on Whang to teach combined indexes having data generated from structured and unstructured conditions.

Claim 5, this claim was rejected based on the Beavin reference. The Examiner has relied on Beavin to teach parsing text (column 15, lines 30-45). The limitations for an associative query that has both structured and unstructured data was presented in independent claims 1, 10, 16, and 21 in the Office Action, March 18, 2004, paper no. 7, as well in the arguments presented above.

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The remaining claims 8, 9, and 15 each comprise claim limitations corresponding substantially to the above-discussed claim limitations and are also addressed by the above remarks.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 7, 10, 12, 16, 17, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. (Pat. No. 5,557,791, filed October 19, 1994, hereinafter Cheng) and Chaudhuri et al. (Pat. No. 6,169,983 B1, filed May 30, 1998, hereinafter Chaudhuri).

7. Regarding Claims 1, 10, and 16, Cheng teaches outer join operations using responsibility regions assigned to inner tables in a relational database.

The method and associated system for outer join operations using responsibility regions assigned to inner tables in a relational database as taught or suggested by Cheng includes:

identifying one or more unstructured data columns (column 2 lines 36-42, column 3 lines 27-30 and 60-65) and one or more structured data columns (column 6 lines 58-67, column 7 lines 1-7) from a database (Abstract, lines 1-3); generating an index of unstructured data columns (col. 6, lines 58-67, col. 7, lines 1-7) and structured data columns (col. 2, lines 36-42, col. 3, lines 27-30 and 60-65); providing associative access to the database using a query (column 2, lines 55-59, column 3, lines 25-30 and lines 55-64, column 4 lines 15-49, column 15, lines 47-67) that includes unstructured conditions (col. 2, lines 36-42, col. 3, lines 27-30 and 60-65) and structured conditions (col. 3, lines 52-67, col. 4, lines 1-15 and 30-50).

However, Cheng does not expressly teach generating a combined index.

Chaudhuri teaches generating a combined index (Abstract, lines 1-8) and a user interface for receiving instructions from a user (col. 4, lines 65-67, col. 5, lines 1-8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng with Chaudhuri's method of a combined index because Chaudhuri's method enables an index merge tool helps form, for use by database server in accessing a database in accordance with a workload of queries, an index configuration or set of indexes that consumes relatively less storage space, the index merge tool identifies from an initial set of indexes one or more combinations of two or more indexes on the same table of the database and merges each identified combination of indexes to form a merged set of indexes (Abstract, lines 1-8).

8. Regarding Claims 7 and 17, Cheng teaches the unstructured data column includes text (col. 4, lines 35-44).

9. Regarding Claim 12, Chaudhuri teaches rows having text data including one or more words (col. 5, lines 48-53).

10. Regarding Claim 21, Cheng teaches the means which essentially comprise the same means as the structured data is an unstructured data converted to a structured form (col. 3, lines 25-67).

11. Claims 2, 3, 4, 6, 11, 13, 14, 18, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. (Pat. No. 5,557,791, filed October 19, 1994, hereinafter Cheng) and Chaudhuri et al. (Pat. No. 6,169,983 B1, filed May 30, 1998,

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hereinafter Chaudhuri) as applied to claims 1, 10, and 16 above, and further in view of Whang et al. (Pat. No. 6,349,308 B1, filed February 19, 1999, hereinafter Whang).

12. Regarding Claims 2 and 18, Cheng and Chaudhuri do not expressly teach an inverted index.

However, Whang teaches an inverted index (Abstract, lines 1-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the methods of Cheng and Chaudhuri with Whang's method of an inverted index because Whang's method enables an inverted index, an inverted index is an index used for information retrieval (IR), i.e. for retrieving documents containing the keywords given by a user, the inverted index maintains a list of postings for each keyword extracted from the documents, insertion, deletion, and modification of documents entail dynamic update of the inverted index, thus the inverted index needs a storage structure for effectively managing the posting lists, which is of variable size (col. 3, lines 23-28).

13. Regarding Claims 3 and 13, Whang teaches tokens where the inverted index table is generated based on the tokens (col. 3, lines 22-37, col. 6, lines 32-61).

14. Regarding Claims 4, 11, 14, 19, and 20, Whang teaches a B-tree from the inverted index table to form the combined index (col. 4, lines 61-67), where a first level of branching is based on the tokens (col. 4, lines 61-67, col. 5, lines 18-47) and a second level of branching is based on values (col. 4, lines 61-67, col. 5, lines 18-47).

15. Regarding Claim 6, Whang teaches the means which essentially comprise the same means as adding to the inverted index (col. 3, lines 22-38).

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16. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. (Pat. No. 5,557,791, filed October 19, 1994, hereinafter Cheng); Chaudhuri et al. (Pat. No. 6,169,983 B1, filed May 30, 1998, hereinafter Chaudhuri); and Whang et al. (Pat. No. 6,349,308 B1, filed February 19, 1999, hereinafter Whang) as applied to claims 1 and 2 above, and further in view of Beavin et al. (Pat. No. 6,272,488 B1, filed March 26, 1999, hereinafter Beavin).

17. Regarding Claim 5, Cheng, Chaudhuri, and Whang do not expressly teach parsing text.

Beavin teaches parsing text (col. 15, lines 30-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the methods of Cheng, Chaudhuri, and Whang with the method of Beavin because Beavin's method enables collecting multi-column statistics by database management system to reflect a relationship among multiple columns of a table in a relational database, these statistics are stored in the system catalog, and are used during query optimization to obtain an estimate of the number of qualifying rows when a query has predicates on multiple columns of a table.

18. Claims 8, 9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. (Pat. No. 5,557,791, filed October 19, 1994, hereinafter Cheng) and Chaudhuri et al. (Pat. No. 6,169,983 B1, filed May 30, 1998, hereinafter Chaudhuri) as applied to claims 10 and 1 above, and further in view of Nelson et al. (Pat. No. 6,243,713 B1, filed August 24, 1998, hereinafter Nelson).

19. Regarding Claims 8 and 15, Cheng and Chaudhuri do not expressly teach unstructured data includes data being one of image data, video data, and audio data.

Nelson teaches unstructured data includes being one of image data, video data, and audio data (Abstract, lines 1-7, col. 6, lines 35-39, figure 2, element 100, 'Multimedia Document – Text – Image – Video – Audio).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the methods of Cheng and Chaudhuri with Nelson's method of unstructured data because Nelson's method enables software product which provides for true multimedia document retrieval by receiving multimedia queries containing various types of data, such as text keywords, images, and audio or other data types, and processing such queries against a multimedia index that commonly indexes multimedia documents, including any of their multimedia components (Abstract, lines 1-7).

20. Regarding Claim 9, the limitations of these claims have been noted in the rejection above. In addition, Nelson teaches generating a signature for each of the data of the unstructured data (Abstract, lines 17-19).

21. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

NAME OF CONTACT

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheryl Lewis whose telephone number is (703) 305-8750. The examiner can normally be reached on 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (703) 305-9790. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

(703) 746-5651 (Use this FAX #, only after approval by Examiner, for "INFORMAL" or "DRAFT" communication. Examiners may request that a formal paper/amendment be faxed directly to them on occasions.).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



Cheryl Lewis
Patent Examiner
May 25, 2004



JOHN BREENE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100